CENTRAL INSTITUTE OF PETROCHEMICALS ENGINEERING & TECHNOLOGY
HEAD OFFICE: GUINDY, CHENNAI – 600 032.
ACADEMIC CELL
THIRD SEMESTER EXAMINATION – JANUARY - 2024

Duration : 3 Hours   Max. Marks: 60
Course   : DPT   Date : 08.01.2024
Subject : Polymer Science & Engineering   Time : 10.00 a.m. to 01.00 p.m.
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(DO NOT CHANGE SEQUENCE OF QUESTION NUMBER IN ANSWER SCRIPT)
PART – A
Answer **all** questions   12 x 1 = 12

1. In which polymerization process typically high temperature and pressure requires?
   a) Condensation Polymerization b) Addition Polymerization
2. The commonly used standard test method for MFI determination is -
   a) ASTM D 638 b) ASTM D1238   c) ASTM E 23   d) d) None of these
3. Acrylonitrile Butadiene Styrene is an example of -
   a) Oligomer b) Resin c) Co polymer   d) None of these
4. The emulsifier stabilizes the emulsion and prevents the coagulation of polymer particles in Emulsion Polymerization process. (say True or False)
5. The End-group analysis concept is used for determination of molecular weight of polymer. (say True or False)
6. Branched polymers are insoluble and infusible. (say True or False)
7. The _____molecular weight is the sum of the product of each molecular weight and its respective fraction in a polymer sample. (Fill in the blank)
8. In fabric industry, ____ is a commonly used condensation polymer. (Fill in the blank)
9. Creep is often more prominent at _____ temperatures and higher stress levels. (Fill in the blank)
10. Expand CMC.
11. Expand DMA.
12. Expand MWD.

PART – B
Answer **all** questions (Max. 40 words)   4 x 2 = 8

1. What is the role of inhibitor and retarder in polymerization process?
2. How does the molecular weight of polymer can be correlated with the polymer solubility?
3. Define the shear thinning behaviour in polymer.
4. How does the crystallinity affect the transparency of plastics?

PART – C
Answer any **six** questions (Max. 100 words)   6 x 4 = 24

1. Write the difference between Newtonian and Non-Newtonian Fluids.
2. Divide the polymers based on stereoisomerism with examples.
3. Discuss the significance of Polydispersity Index (PDI) of polymer.
4. Write short note on thermal degradation of polymer.
5. Discuss the interfacial polymerisation techniques.
6. Discuss the advantages and disadvantages of Bulk polymerization techniques.
7. How MFI is used to characterize the flow characteristics of polymers.

PART – D
Answer any **two** questions (Max. 300 words)   2 x 8 = 16

1. Define glass transition temperature (Tg) of polymers. Discuss the different factors influencing the Tg.
2. Describe the Chain polymerization process for ethylene monomer.
3. Discuss the GPC technique for determination of Molecular Weight of polymers.

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THIRD SEMESTER EXAMINATION – JANUARY - 2024

Duration : 3 Hours   Max. Marks: 60
Course   : DPT   Date : 09.01.2024
Subject : Plastics Materials-I   Time : 10.00 a.m. to 01.00 p.m.
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(DO NOT CHANGE SEQUENCE OF QUESTION NUMBER IN ANSWER SCRIPT)

PART – A
Answer **all** questions   12 x 1 = 12

1. Bakelite is the trade name of _____ resin
     a. Urea   b. Epoxy   c. Melamine   d. Phenolic
2. Which of the following material forms atactic polymer.
     a. PC   b. PP   c. LDPE   d. Nylon
3. E-caprolactam is the monomer for _____.
     a. Nylon 6   b. Nylon 66   c. PC   d. None of these
4. Shellac orginates from _____
5. Density of LLDPE in g/cc is _____
6. One example of ter polymer is _____
7. Philips process is used to prepare both PE and PP. True / False
8. Natural Rubber is cis-Polyisoprene. True / False
9. K-value is calculated for PVC material. True / False
10. The full form of PVDC is _____
11. The full form of PAN is _____
12. The full form of PMMA is _____

PART – B
Answer **all** questions (Max. 40 words)   4 x 2 = 8

1. What do you mean by degradation of Polymers.
2. Write the isotactic and atactic structure of Polystyrene.
3. Write the advantages of melamine formaldehyde over urea formaldehyde.
4. Write three important properties of Polypropylene.

PART – C
Answer any **six** questions (Max. 100 words)   6 x 4 = 24

1. Write short notes on Phenol Formaldehyde.
2. Write any four applications of Epoxy resin.
3. Expand ABS. write the significance of A, B and S in the ABS material.
4. Write few properties and applications of PVC.
5. Write the name of monomers of the following polymers –
     a. Natural Rubber   b. Nylon 6   c. Bakelite   d. PC.
6. Write down the applications of LDPE.
7. Define Commodity plastics and Engineering Plastics with example.

PART – D
Answer any **two** questions (Max. 300 words)   2 x 8 = 16

1. Define styrenic materials? Describe styrene and its different copolymers.
2. Write the reaction involved and explain the preparation, properties and applications of HDPE.
3. Write the sources of raw material for PF resin and mention its preparation, properties and applications.

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THIRD SEMESTER EXAMINATION – JANUARY - 2024

Duration : 3 Hours   Max. Marks: 60
Course   : DPT   Date   : 10.01.2024
Subject : Plastics Processing Technology-I   Time   : 10.00 a.m. to 01.00 p.m.

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(DO NOT CHANGE SEQUENCE OF QUESTION NUMBER IN ANSWER SCRIPT)
PART – A
Answer **all** questions   12 x 1 = 12

1. Annealing of plastic product is done
   (a) To avoid frozen-in orientation   (b) to prevent stress cracking   (c) both a & b   (d) none
2. Injection moulding machine is specified as per
   (a) Clamping tonnage   (b) Weight of the machine   (c) Plasticizing capacity   (d) Both a & c
3. A typical injection moulding cycle will start with
   (a) Injection   (b) Ejection   (c) Cooling   (d) Mould closure
4. Rack & Pinion assembly is a part of _____
5. Actual cycle time without cooling time is called _____
6. Flash is caused by _____
7. Spring shut-off nozzle is suited for HDPE (True / False)
8. Band heaters are Mica & Ceramic insulated   (True / False)
9. The section of screw where max. stress is applied to the material inside barrel is Metering zone
   (True / False)
10. Full form of HDPE
11. Full form of BR
12. Full form of PS

PART – B
Answer **all** questions (Max. 40 words)   4 x 2 = 8

1. What is Compression Ratio (CR)?
2. Name the three heater zones found in the injection barrel?
3. What is Cushion?
4. What is Blow ratio?

PART – C
Answer any **six** questions (Max. 100 words)   6 x 4 = 24

1. What is breaker plate?
2. Write advantages of injection blow molding process.
3. What is Hot Runner Mould (Runner less mold)?
4. What is significance of Screw RPM?
5. What is significance of larger L/D ratio?
6. What is annealing?
7. What is Parison swell?

PART – D
Answer any **two** questions (Max. 300 words)   2 x 8 = 16

1. Explain the Injection moulding Process.
2. Draw and explain 4 defects occurs in injection moulding process
3. Write the basics of Automation and its application.

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THIRD SEMESTER EXAMINATION – JANUARY - 2024

Duration : 3 Hours   Max. Marks: 60
Course   : DPT   Date : 11.01.2024
Subject : Engineering Drawing   Time : 10.00 a.m. to 01.00 p.m.
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(DO NOT CHANGE SEQUENCE OF QUESTION NUMBER IN ANSWER SCRIPT)
PART – A
Answer **all** questions   12 x 1 = 12

1. The length to height ratio of a closed filled arrow head is?
   (a) 1:3   (b) 3:1   (c) 1:2   (d) 2:1
2. Two types of dimensions needed on a drawing are:
   i) size or functional dimensions and   ii) location or datum dimensions.(True/False)
3. In order to create an accurate assembly drawing the drafter should create the …………..drawings first.
4. The line along which a plane meets the reference plane is known as ……………..
5. The additional planes of projection which are set up to obtain the true sizes are called -
       (a) Auxiliary Planes   (b) Section Planes   (c) True Planes   (d) None of the above
6. The development of the curved surface of a cone is a sector of circle. (Say true or false)
7. Dimensions can be placed anywhere irrespective of the features visible. (Say True or False)
8. The ratio of the shortest distance of the tracing point from the focus to its perpendicular distance from the directrix is called …………………….
9. Which type of washer is used for locking the nut by bending the washer against the side of nut ?
    a) Tab Washer   b) Locking Plates   c) Spring Washer   d) Locking Washer with lug
10. Write the Full form of ISO…………..
11. ASME stands for………….
12. What does BSW stand for……………?

PART – B
Answer **all** questions (Max. 40 words)   4 x 2 = 8

1. What are the two systems of placing dimensions on a drawing?
2. What is Representative Fraction?
3. Define true shape of a Plane surface.
4. What is coupling?

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PART – C
Answer any **six** questions (Max. 100 words)   6 x 4 = 24

1. Differentiate between first and third angle projection with symbols.
2. Draw an involute of a circle of diameter 30 mm.
3. Briefly explain Isometric Projection.
4. Explain the types of Sectional View with neat sketch?
5. Explain the types of nut with neat sketch.
6. What do you understand by bill of materials and parts list?
7. Explain the need of assembly drawing and its importance.

PART – D
Answer any **two** questions (Max. 300 words)   2 x 8 = 16

1. Construct an ellipse when the distance of the focus from the directrix is equal to 30 mm and eccentricity is equal to 7/9.
2. Draw the projections of the following points on the same ground line, keeping the projectors 25 mm apart.
       A, in the H.P. and 20 mm behind the V.P.
       B, 40 mm above the H.P. and 25 mm in front of the V.P.
       C, in the V.P. and 40 mm above the H.P.
       D, 25 mm below the H.P. and 25 mm behind the V.P.
       E, 15 mm above the H.P. and 50 mm behind the V.P.
       F, 40 mm below the H.P. and 25 mm in front of the V.P.
       G, in both the H.P. and the V.P.
3. Write the methods of development of surfaces.

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THIRD SEMESTER EXAMINATION – JANUARY - 2024

Duration : 3 Hours   Max. Marks: 60
Course : DPT   Date : 12.01.2024
Subject : Mould Manufacturing   Time : 10.00 a.m. to 01.00 p.m.
_____

(DO NOT CHANGE SEQUENCE OF QUESTION NUMBER IN ANSWER SCRIPT)

PART – A
Answer **all** questions   12 x 1 = 12

1. Suitable Guide Pillar material for Injection Mould can be _____.
   (a) EN-31&EN-353   (b) EN-2& EN-2A   (c) C-40 & C-45   (d) MS
2. Taper Turning Operation can be performed by _____ m/c.   .
   (a) Drilling   (b) Boring   (c) Grinding   (d) Lathe
3. Suitable Electrode material for EDM can be _____.
   (a) Bakelite   (b) SiC   (c) Graphite   (d) All of these
4. P-20 is suitable material for _____ parts of Injection Mould manufacturing.
5. Arcing is a defects of _____ machining.
6. Alloying element_____, helps to increase the hardness of Mould steel.
7. Thread cutting operation can be performed through surface grinding machine. (Say True or False).
8. Less Flushing helps to increase the better performance of EDM operations. (Say True or False).
9. Case harden steel is not suitable for making Guide Bush. (Say True or False).
10. What is the abbreviation of EDM?
11. What is the abbreviation of CNC?
12. What is the abbreviation of mould steel material HDS?

PART – B
Answer **all** questions (Max. 40 words)   4 x 2 = 8

1. Define Physical Mould Life.
2. What is the role of alloying element in Mould steel?
3. What is "O" ring?
4. What are the advantages of preventive mould maintenance?
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PART – C
Answer any **six** questions (Max. 100 words)   6 x 4 = 24

1. Write any four alloying elements name and their effects on Mould steel?
2. Prepare a mould History sheet.
3. Write any four non-ferrous material names and their application in mould manufacturing.
4. Explain the steps of manufacturing of Sprue Bush.
5. Explain about the factors effects on physical Mould Life.
6. Write the application of Wire-cut EDM in mould manufacturing.
7. Write the application of Jig boring machine in mould manufacturing

PART – D
Answer any **two** questions (Max. 300 words)   2 x 8 = 16

1. Explain the working principle of EDM machine with neat sketch.
2. Explain the Factors effecting on selection of mould parts material.
3. Explain in details about Mould removing, Mould cleaning and Mould storage.

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